

**Electronic Filing System (EFS) Data**  
**Electronic Patent Application Submission**  
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EFS ID: 15565  
Application ID: 10064006  
Title of Invention: OVERALL SCHEDULING OF A LEAN  
BURN ENGINE SYSTEM  
First Named Inventor: Gopichandra Surnilla  
Domestic/Foreign Application: Domestic Application  
Filing Date: null  
Effective Receipt Date: 2002-06-04  
Submission Type: Utility Patent Filing  
Filing Type: new-utility  
Confirmation Number: 0  
Attorney Docket Number: 202-0402  
Digital Certificate Holder: cn=Damian Porcari, ou=Registered Attorneys, ou=Patent and  
Trademark Office, ou=Department of Commerce, o=U.S.  
Government, c=US  
Certificate Message Digest: dlblIkOYljRxjLBLOEypUg==  
Total Fees Authorized: \$940.0  
Payment Category: DA - Deposit Account  
Deposit Account Number: 61510  
Deposit Account Name: Sheri L. Charles



# TRANSMITTAL FORM

10474 U.S. PRO  
10/064006  
06/04/02

Electronic Version 1.0.3

Stylesheet Version: 1.0

Attorney Docket  
Number:

202-  
0402

Submission Type: Utility Patent  
Filing

## OVERALL SCHEDULING OF A LEAN BURN ENGINE SYSTEM

First Named Inventor: Gopichandra Surnilla

### SUBMITTED BY

Organization Name:

Ford Motor Company

Name:

Sheri Lynn Charles Electronic  
Application Specialist

Electronic Signature Mark: /slc

Date Signed: 20020604

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### Attached Files:

declaration	consentletter.tif
declaration	declaration1of3.tif
declaration	declaration2of3.tif
declaration	declaration3of3.tif

declaration	infodisclosurestatement1of7.tif
declaration	infodisclosurestatement2of7.tif
declaration	infodisclosurestatement3of7.tif
declaration	infodisclosurestatement4of7.tif
declaration	infodisclosurestatement5of7.tif
declaration	infodisclosurestatement6of7.tif
declaration	infodisclosurestatement7of7.tif
bibd-transmittal	202-0402apds.xml
patent-assignments	202-0402asgn.xml
specification	specification.xml
fee-transmittal	202-0402fee.xml

**Attached Image File(s):**

consentletter.tif  
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declaration3of3.tif  
infodisclosurestatement1of7.tif  
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infodisclosurestatement6of7.tif  
infodisclosurestatement7of7.tif

If insufficient funds in deposit account 06-1510, please charge deposit account 06-1505. IDS Statement, Forms PTO/SB/08A and 08B, and prior art to follow via mail in boxes to the USPTO.

[illegible]

PATENT APPLICATION

ASSISTANT COMMISSIONER FOR PATENTS  
Washington, D. C. 20231

Case Docket No. 202-0402  
Date: May 30, 2002

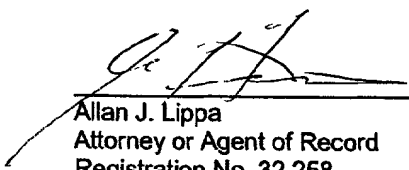
Sir:

Inventor(s):  
**Gopichandra Surnilla**  
**John Roth**

For: **OVERALL SCHEDULING OF A LEAN BURN ENGINE SYSTEM**

The attorney or agent below has reviewed this application and its attachments and consents to electronic filing by the assignee.

Respectfully submitted:



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Allan J. Lipka  
Attorney or Agent of Record  
Registration No. 32,258  
Ford Global Technologies, Inc.  
One Parklane Blvd.,  
600 Parklane Towers East  
Dearborn, MI 48126  
Telephone: 313-594-1145

## DECLARATION AND POWER OF ATTORNEY - ORIGINAL APPLICATION

Attorney's Docket No.  
202-0402

As a below named inventor, I hereby declare:

My residence, post office address and citizenship are as stated below next to my name;

I verily believe I am the original, first and sole inventor or an original, first and joint inventor of the subject matter that is claimed and for which a patent is sought on the invention entitled

**OVERALL SCHEDULING OF A LEAN BURN ENGINE SYSTEM**

the specification of which is attached hereto.

I have reviewed and understand the contents of the specification identified above, including the claims.

I acknowledge my duty to disclose information of which I am aware that is material to the examination of this application in accordance with Section 1.56(a), Title 37 of the Code of Federal Regulations; and as to application for patents or inventor's certificate on the invention filed in any country foreign to the United States of America prior to this application by me or my legal representatives or assigns,

- ☒ no such applications have been filed, or
- ☐ such applications have been filed as follows:
- ☐ I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below

COUNTRY	APPLICATION NO.	DATE OF FILING (month, day, year)	DATE OF ISSUE (month, day, year)	PRIORITY CLAIMED UNDER 35 USC 119	<input type="checkbox"/> Additional provisional application numbers are on a separate priority data sheet (PTO/SB/0) attached hereto

I hereby claim the benefit under 35 U.S.C. § 120 of any United States application(s) or § 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of U.S.C. § 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR § 1.56 became available between the filing date of the prior application and the national or PCT International filing date of this application.

(Application Number)	(Filing Date)	(Status - patented, pending, abandoned)
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(Application Number)	(Filing Date)	(Status - patented, pending, abandoned)
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**POWER OF ATTORNEY:** - I/we hereby appoint Practitioners at Customer No. 022844, as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office and foreign Patent Offices.

Address all correspondence and telephone calls to:

Allan J. Lipka  
Ford Global Technologies, Inc.  
One Parklane Boulevard  
600 East Parklane Towers  
Dearborn, Michigan 48126 Telephone: 313-594-1145

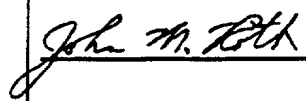
I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements jeopardize the validity of the application or any patent issuing thereon.

NAME AND MAILING ADDRESS OF INVENTOR:	RESIDENCE	CITIZENSHIP	SIGNATURE
Gopichandra Surnilla 5358 Midchester Ct. West Bloomfield, MI 48324 US	West Bloomfield, MI 48324 US	India	
John M. Roth 8751 Woodside Grosse Ile, MI 48138 US	Grosse Ile, MI 48138 US	U.S.A	

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Ford Global Technologies, Inc.  
One Parklane Boulevard  
600 East Parklane Towers  
Dearborn, Michigan 48126 Telephone: 313-594-1145

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John M. Roth 8751 Woodside Grosse Ile, MI 48138 US	Grosse Ile, MI 48138 US	U.S.A	



Substitute for form 1449A/PTO		<b>Complete if Known</b>	
<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANTS</b>  <i>(use as many sheets as necessary)</i>		Application Number	To be assigned
		Filing Date	Herewith
		Applicants	Surname; Roth
		Group Art Unit	
		Examiner Name	
Sheet      1              of      7	Attorney Docket Number		202-0402

U.S. PATENT DOCUMENTS						
EXAMINER INITIAL*	Cite No. <sup>1</sup>	DOCUMENT NUMBER	Kind Code <sup>2</sup> (if known)	NAME	DATE MM-DD-YY	Pages, Columns, Lines, Where Relevant Passages or Rel Figures Appear
		3,696,318		Boyd et al	10-10-72	
		3,969,932		Rieger et al	07-20-76	
		4,033,122		Masaki et al	07-05-77	
		4,178,883		Herth	12-18-79	
		4,251,989		Norimatsu et al	02-24-81	
		4,622,809		Abthoff et al	11-18-86	
		4,854,123		Inoue et al	08-08-89	
		4,884,066		Miyata et al	11-28-89	
		4,913,122		Uchida et al	04-03-90	
		5,009,210		Nakagawa et al	04-23-91	
		5,088,281		Izutani et al	02-18-92	
		5,097,700		Nakane	03-24-92	
		5,165,230		Kayanuma et al	11-24-92	
		5,174,111		Nomura et al	12-29-92	
		5,189,876		Hirota et al	03-02-93	
		5,201,802		Hirota et al	04-13-93	
		5,209,061		Takeshima	05-11-93	
		5,222,471		Stueven	06-29-93	

FOREIGN PATENT DOCUMENTS						
EXAMINER INITIAL*	Cite No. <sup>1</sup>	Foreign Patent Document			NAME	DATE MM-DD-YY
		Office <sup>3</sup>	Number <sup>4</sup>	Kind Code <sup>5</sup> (if known)		
		DE	196 07 151 C1		Siemens AG	07-10-97
		EP	0 351 197 A2		Johnson Matthey	01-17-90
		EP	0 444 783 A1		Lucas Industries	09-04-91

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DATE CONSIDERED

\*Examiner. Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not consider. Include copy of this form with next communication to applicant.

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**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANTS**

(use as many sheets as necessary)

Sheet 2 of 7

**Complete if Known**

Application Number	To be assigned
Filing Date	Herewith
Applicants	Surnilla; Roth
Group Art Unit	
Examiner Name	
Attorney Docket Number	202-0402

**U.S. PATENT DOCUMENTS**

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		5,233,830		Takeshima et al	08-10-93	
		5,267,439		Raff et al	12-07-93	
		5,270,024		Kasahara et al	12-14-93	
		5,272,871		Oshima et al	12-28-93	
		5,325,664		Seki et al	07-05-94	
		5,331,809		Takeshima et al	07-26-94	
		5,335,538		Blischke et al	08-09-94	
		5,357,750		Ito et al	10-25-94	
		5,377,484		Shimizu	01-03-95	
		5,402,641		Kato et al	04-04-95	
		5,412,945		Kato et al	05-09-95	
		5,412,946		Oshima et al	05-09-95	
		5,414,994		Cullen et al	05-16-95	
		5,423,181		Kato et al	06-13-95	
		5,433,074		Seto et al	07-18-95	
		5,437,153		Takeshima et al	08-01-95	
		5,448,887		Takeshima	09-12-95	
		5,450,722		Takeshima et al	09-12-95	

**FOREIGN PATENT DOCUMENTS**

EXAMINER INITIAL*	Cite No. <sup>1</sup>	Foreign Patent Document			NAME	DATE MM-DD-YY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Office <sup>3</sup>	Number <sup>4</sup>	Kind Code <sup>5</sup> (if known)			
		JP	2-207159		Toyota	08-16-90	
		JP	2-30915		Toyota	02-01-90	
		JP	2-33408		Toyota	02-02-90	
		JP	3-135417		Matsushita Elec.	06-10-91	
		JP	5-106493		Honda	04-27-93	

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**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANTS**

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Sheet 3 of 7

**Complete if Known**

Application Number	To be assigned
Filing Date	Herewith
Applicants	Surnilla; Roth
Group Art Unit	
Examiner Name	
Attorney Docket Number	202-0402

**U.S. PATENT DOCUMENTS**

EXAMINER INITIAL*	Cite No. <sup>1</sup>	DOCUMENT NUMBER	Kind Code <sup>2</sup> (if known)	NAME	DATE MM-DD-YY	Pages, Columns, Lines, Where Relevant Passages or Rel Figures Appear
		5,472,673		Goto et al	12-05-95	
		5,473,887		Takeshima et al	12-12-95	
		5,473,890		Takeshima et al	12-12-95	
		5,483,795		Katoh et al	01-16-96	
		5,544,482		Matsumoto et al	08-13-96	
		5,551,231		Tanaka et al	09-03-96	
		5,577,382		Kihara et al	11-26-96	
		5,595,060		Togai et al	01-21-97	
		5,598,703		Hamburg et al	02-04-97	
		5,622,047		Yamashita et al	04-22-97	
		5,655,363		Ito et al	08-12-97	
		5,657,625		Koga et al	08-19-97	
		5,693,877		Ohsuga et al	12-02-97	
		5,713,199		Takeshima et al	02-03-98	
		5,715,679		Asanuma et al	02-10-98	
		5,724,808		Ito et al	03-10-98	
		5,732,554		Sasaki et al	03-31-98	
		5,735,119		Asanuma et al	04-07-98	

**FOREIGN PATENT DOCUMENTS**

EXAMINER INITIAL*	Cite No. <sup>1</sup>	Foreign Patent Document			NAME	DATE MM-DD-YY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Office <sup>3</sup>	Number <sup>4</sup>	Kind Code <sup>5</sup> (if known)			
		JP	5-106494		Honda	04-27-93	
		JP	5-26080		Mitsubishi Motors	02-02-93	
		JP	62-117620		Nippon Shokubai	05-29-87	
		JP	6-264787		Nissan Motor	09-20-94	
		JP	62-97630		Nippon Shokubai	05-07-87	

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# INFORMATION DISCLOSURE STATEMENT BY APPLICANTS

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Sheet 4 of 7

Application Number	To be assigned
Filing Date	Herewith
Applicants	Sumilla; Roth
Group Art Unit	
Examiner Name	
Attorney Docket Number	202-0402

## U.S. PATENT DOCUMENTS

EXAMINER INITIAL*	Cite No. <sup>1</sup>	DOCUMENT NUMBER	Kind Code <sup>2</sup> (if known)	NAME	DATE MM-DD-YY	Pages, Columns, Lines, Where Relevant Passages or Rel Figures Appear
		5,740,669		Kinugasa et al	04-21-98	
		5,743,084		Hepburn	04-28-98	
		5,746,049		Cullen et al	05-05-98	
		5,746,052		Kinugasa et al	05-05-98	
		5,752,492		Kato et al	05-19-98	
		5,792,436		Feeley et al	08-11-98	
		5,842,340		Bush et al	12-01-98	
		5,865,027		Hanafusa et al	02-02-99	
		5,970,707		Sawada et al	10-26-99	
		5,974,793		Kinugasa et al	11-02-99	
		5,983,627		Asik	11-16-99	
		6,014,859		Yoshizaki et al	01-18-00	
		4,036,014		Ariga	07-19-77	
		4,964,272		Kayanuma	10-23-90	
		5,410,873		Tashiro	05-02-95	
		5,412,945		Katoh et al	05-09-95	
		5,419,122		Tabe et al	05-30-95	
		5,437,153		Takeshima et al	08-01-95	

## FOREIGN PATENT DOCUMENTS

EXAMINER INITIAL*	Cite No. <sup>1</sup>	Foreign Patent Document			NAME	DATE MM-DD-YY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Office <sup>3</sup>	Number <sup>4</sup>	Kind Code <sup>5</sup> (if known)			
		JP	64-53042		Mitsubishi	03-01-89	
		JP	6-58139		Nissan Motor	03-01-94	
		JP	7-97941		Kazuhiro et al	04-11-95	
		EP	0 351 197 A1		Johnson Matthey	01-17-90	
		EP	0 503 882 A1		S. Takeshima	09-16-92	

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# INFORMATION DISCLOSURE STATEMENT BY APPLICANTS

(use as many sheets as necessary)

Sheet 5 of 7

## Complete if Known

Application Number	To be assigned
Filing Date	Herewith
Applicants	Surnilla; Roth
Group Art Unit	
Examiner Name	
Attorney Docket Number	202-0402

## U.S. PATENT DOCUMENTS

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		5,452,576		Hamburg et al	09-26-95	
		5,483,795		Katoh et al	01-16-96	
		5,626,014		Hepburn et al	05-06-97	
		5,626,117		Wright et al	05-06-97	
		5,713,199		Takeshima et al	02-03-98	
		5,715,679		Asanuma et al	02-10-98	
		5,722,236		Cullen et al	03-03-98	
		5,771,685		Hepburn	06-30-98	
		5,771,686		Pischinger et al	06-30-98	
		5,778,666		Cullen et al	07-14-98	
		5,802,843		Kurihara et al	09-08-98	
		5,803,048		Yano et al	09-08-98	
		5,832,722		Cullen et al	11-10-98	
		5,938,715		Zang et al	08-17-99	
		5,974,788		Hepburn et al	11-02-99	
		5,974,791		Hirota et al	11-02-99	
		5,922,142		Pott	11-30-99	
		5,996,338		Hirota	12-07-99	

## FOREIGN PATENT DOCUMENTS

EXAMINER INITIAL*	Cite No. <sup>1</sup>	Foreign Patent Document			NAME	DATE MM-DD-YY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Office <sup>3</sup>	Number <sup>4</sup>	Kind Code <sup>5</sup> (if known)			
		EP	0 580 389 A1		Toyota	01-26-94	
		WP	98/27322		Ford Motor Co.	06-25-98	
		JP	7-166851		Toyota	06-27-95	

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		Applicants	Sumilla; Roth
		Group Art Unit	
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Sheet    6       of    7		Attorney Docket Number	202-0402

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		6,012,428		Yano et al	01-11-00	
		6,023,929		Ma	02-15-00	
		6,058,700		Yamashita et al	05-09-00	
		5,479,898		Cullen et al	01-02-96	
		6,189,316		Surnilla et al	02-20-01	
		5,497,745		Cullen et al	03-12-96	

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<sup>1</sup>Unique citation designation number. <sup>2</sup>Applicant is to place a check mark here if English language Translation is attached. <sup>3</sup>Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>4</sup>For Japanese patent documents, the indication of the year of the reign of the Emperor must preced serial number of the patent document. <sup>5</sup>Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. <sup>6</sup>Applicant is to place a check mark here if English language Translation is attached.

Substitute for form 1449A/PTO		<b>Complete if Known</b>	
<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  <i>(use as many sheets as necessary)</i>		Application Number	To be assigned
		Filing Date	Herewith
		Applicants	Surnilla; Roth
		Group Art Unit	
		Examiner Name	
Sheet 7 of 7	Attorney Docket Number	202-0402	

# **OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS**

EXAMINER INITIAL*	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published
		JOE THEIS et al, "An Air/Fuel Algorithm To Improve The NOx Conversion Of Copper-Based Catalysts", SAE Technical Paper No. 922251, October 19-22, 1992, pp. 77-89.
		Y. KANEKO et al, "Effect of Air-Fuel Ratio Modulation on Conversion Efficiency of Three-Way Catalysts", INTER-INDUSTRY EMISSION CONTROL PROGRAM 2 (IIEC-2) PROGRESS REPORT NO. 4, SAE Technical Paper No. 780607, June 5-9, 1978, pp. 119-127.
		ALAN F. DIWELL, "Engineered Control Strategies For Improved Catalytic Control of NOx in Lean Burn Applications", SAE Technical Paper No. 881595, 1998, pp. 1-11.
		ALLEN H. MEITZLER, "Application of Exhaust-Gas-Oxygen Sensors to the Study of Storage Effects in Automotive Three-Way Catalysts", SAE 800019, February 25-29, 1980.
		W.H. HOLL, "Air Fuel Control to Reduce Emissions, I. Engine-Emissions Relationships", SAE 800051, February 25-29, 1980.
		WEI-MING WANG, "Air-Fuel Control to Reduce Emissions, II. Engine-Catalyst Characterization Under Cyclic Conditions", SAE 800052, February 25-29, 1980.
		CHRISTOPHER D. DE BOER et al, "Engineered Control Strategies for Improved Catalytic Control of NOx in Lean Burn Applications", SAE 881595, October 10-13, 1988.
		TOSHIAKI YAMAMOTO et al, "Dynamic Behavior Analysis of Three Way Catalytic Reaction", JSAE 882072 - 882166

EXAMINER

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Electronic Version 1.1.0

Stylesheet Version: 1.0

*Patent fees are subject to annual revisions on or about October 1st of each year.*

Large Entity

**TOTAL FEES AUTHORIZED: \$ 940**

The commissioner is hereby authorized to charge indicated processing and/or publication fees and credit any overpayments to:

Deposit Account Number: 06-1510

Deposit Account Name: Ford Global Technologies, Inc.



Charge Any Additional Fee Required Under 37 C.F.R. Sections 1.16 and 1.17.

Charge Assignment Fees Required Under 37 C.F.R. Section 1.21 (h).

## SUBMITTED BY

Authorized Name: Sheri L. Charles

Electronic Signature Mark: /slc

Date Signed: 20020604

## BASIC FILING FEE

Fee Description	Fee Code	Fee Paid
Utility Filing Fee	101	\$ 740

Subtotal For Basic Filing Fee: \$ 740

## EXTRA CLAIM FEES

	Fee Code	Fee	Extra Claims	Fee Paid
Total Claims: 22	103	\$ 18	2	\$ 36
Independent Claims: 4	102	\$ 84	1	\$ 84



Subtotal For Extra Claims Fees: \$ 120

**ADDITIONAL FEES**

Fee Description	Number	Quantity	Fee Code	Amount	Fee Paid
Recording Each Patent Assignment Per Property Fee	00000000	1	581	\$ 40	\$ 40
Recording Each Patent Assignment Per Property Fee	00000000	1	581	\$ 40	\$ 40

Subtotal For Additional Fees: \$ 80